REVIEWS.

A BOTANIST IN SOUTHERN AFRICA, by J. Hutchinson. With a foreword by Field-Marshal The Rt. Hon. J. C. Smuts. London: P. R. Gawthorn, 1946. Pp. xii and 686. Numerous illustrations. 56/3 net.

This imposing volume is the largest and possibly the most important work on the flora of South Africa that has appeared for a long time. It is not a flora nor a description of the vegetation, but is a record of the journeys made by the author in the Union in 1928-9 and on a trip to Lake Tanganyika in 1930. The whole book is arranged on the sequence followed on these journeys.

This is a book for the botanist. While there are mentions of people, customs, scenery, roads and so forth, plants occupy very much the largest part. The author is a real enthusiast for plants and plant collecting and the reader is conscious of his enthusiasm bubbling over on almost every page. He writes with an assurance that his enthusiasms are shared. His joy in the finding of plants unknown to him or of plants with curious or interesting features of structure or distribution, is faithfully recorded.

Along with the notes on his travels and lists of the plants collected, often placed as footnotes, there are numerous annotations on identification, nomenclature, some descriptions of new species or varieties, and comments on distribution and affinities. The fact that all this information is arranged according to the sequence of its observation by the author on his various journeys, makes the book somewhat difficult to read consecutively. But taken portion by portion there are features that everyone will find of interest and of importance from some point of view or other. It is unfortunate that a work based upon this plan and one containing such masses of rather detached information is not provided with an index or even with a full synopsis. This makes reference to and the finding of the items of information unnecessarily difficult.

The book is divided into five parts. Part I deals with the S.-W. Cape, Namaqualand and the Karroo, and is the fullest. This was the author's starting point, and it was here that he was studying a flora with less affinity with those of other regions than on the rest of his wanderings. He comes out as a strong supporter of the view that this Cape flora is of southern origin and he quotes many examples of its association with the flora of Australia. Part II is much shorter. It covers journeys to George, Port Elizabeth, Natal and on to Pretoria. Included here is a list of the principal trees of the Knysna forests with their distributions both in S. Africa and outside. There are also five pages of drawings of leaves of these trees. Part III, which covers the northern part of the Union, is rather more detailed. The flora here is allied to that of tropical Africa, upon which the author is an authority. At the end of this part is an account of the return journey to Cape Town by way of the central Karroo, Little Karroo and Hermanus. This makes the lack of an index apparent. The notes on these areas are quite separated from those on neighbouring regions. Part IV is an outline sketch of the trip to Lake Tanganyika and back. Part V deals with some general features. It opens with a sketch of the floral regions of S. Africa. Fifteen are recognised. Each of these is given a separate map to show its extent, a curious arrangement which has no obvious advantages over a single combined map. This is followed by a summary of the literature dealing with the flora arranged chronologically and extending from 1644 to 1944. This list should prove most useful to all workers on the flora. A short historical account of the exploration of the flora follows, in which the travels of Thunberg and of Burchell are treated more fully than others. At the close is a chapter on the author's arrangement of the families of flowering plants on a phylogenetic basis. A chart of the supposed relations is given, but this chapter is too short to be of much value to those not already familiar with the subject.

The volume is lavishly illustrated. There are numerous reproductions of the author's photographs, nearly all of which are clear and distinct, also a large number of his own drawing of plants that he found, and many maps and diagrams. In addition, there are incorporated as whole-page plates about fifty of Dr. Pole-Evans' superb photographs of vegetation. The wealth of illustration alone makes the book of great value and this will undoubtedly be its principal appeal to the non-botanist. The general get-up and type is excellent, a very few mistakes occur in the placing of footnotes.

While botanists will not all agree with all the views expressed by the author, they must all unite in congratulating him on the production of a unique book and one with great general interest and much scientific value. A final word may be said in praise of the striking and most uncommon dust-cover.

R. S. Adamson.

FOREST SOILS AND FOREST GROWTH. By S. A. Wilde, Sc.D. Univ. of Wisconsin, U.S.A. Published by Chronica Botanica Company, Waltham, Mass., U.S.A., Central News Agency, Ltd., Johannesburg, Union of S.A. A New Series of Plant Science Books, Vol. 18; Sup. roy. Oct., buckram, 241 pp., 20 tables, 7 plates. Price 5 dollars. 1946.

This book provides an admirable general introduction to the study of forest soils and forest growth. The traditional European literature has been capably condensed and combined with the contributions made in modern publications to form a coherent account which bears the distinctive features of scientific forestry. The references are very liberal and over 600 publications are listed. Quotations from classical literature, some of considerable historical interest, head the various chapters and enliven the text.

In the first historical and introductory chapter, forest soil is described as a "portion of the earth's surface which serves as a medium for the sustenance of forest vegetation; it consists of mineral and organic matter, permeated by varying amounts of water and air, and inhabited by organisms; it exhibits peculiar characteristics impressed by the physical and chemical action of the tree roots and forest debris." Forest soils are thus not merely soils where forests can grow, but soils that have been built up, enriched in organic material, and given a characteristic structure under a covering of forest vegetation. Thereby forest soils are distinguished from agricultural and waste soils, and this close interrelationship between the soil and the forest crop justifies the treatment of forest soils and forest growth in one volume.

In the second chapter the genesis of soils is described. Weathering, differentiation of the soil profile, the relation of soils to climate, parent material, topography and vegetation, and the influence of time in the formation of soil are briefly referred to. The author associates desirable "mull humus" with hardwood species, and acid "mor humus" with conifer species, but this is somewhat arbitrary, because these processes may be strongly influenced by silvicultural treatment and other factors. Acid humus is most frequently formed in dense stands, in cold localities, on soils deficient in lime, and these conditions apply more often in conifer than hardwood stands.

The classification of genetic soil groups and their descriptions, given in chapters III and IV, are concise and clear. Some doubt is, however, felt about the use of the title "Charral Soils" for the group carrying sclerophyllous vegetation, which is derived from the name applied to sclerophyllous forest in Latin America. The dominating influence on the formation of sclerophyll vegetation and the soils associated with it is the characteristic Mediterranean climate, marked by a wet winter, long dry summer and mild temeratures throughout the year. Some title referring to such a climate, or better still to a common feature of the soils in the group, would have been preferable. Confusion may also result because this type of vegetation is called " Chapparal " in California. It is not advisable to associate a local name of vegetation with a widely distributed soil group. Wilde writes of soils belonging to this group that they " produce returns, under planned management incomparably greater than do most other groups of forest soils ". An outstanding example of this is furnished by the successful cultivation of *Pinus radiata* D.Don (*P. insignis*) in the south-western Cape.

Chapter V, dealing with the forest cover, is somewhat fragmentary. Some of the short paragraphs under sub-titles, such as " Mass Action of the Forest " and " Succession and Soil Development ", could well have been expanded into whole chapters.

Physical and chemical properties of soils are reviewed in chapters VI and VII. In contrast to older literature, the importance of chemical properties is quite rightly stressed and it is clearly established that forest pedologists have in the past been too preoccupied with the water relationships and physical properties of soils.

Organisms of forest soils are described in chapter VIII. For determining the number of micro-organisms in the soil only the method of counting colonies of bacteria and fungi cultured from sampled suspensions on nutrient agar, is given. Exact counts are, however, done directly under the microscope. Omissions of specialised information such as this do not detract from the value of the book as a general account of forest soils, and this chapter as well as chapters IX—Forest Humus, X—Soil-Forest Types, XI—Forest Soil Survey, XII—Soils and Tree Planting, XIII—Amelioration of Forest Soils, XIV—Silvicultural Cuttings in Relation to Soils, are adequate as general introductory accounts of these subjects. Forest officers will, however, have to consult more specialised literature, and also rely largely on their own experience, when they desire to investigate soils and apply field observations in practical forestry.

The book would not have suffered had chapter XV been excluded. The information given is too general to be of practical value and the subjects—preparation of yield tables, determination of annual cut, calculation of expected financial return of reafforestation investment, evaluation of forest land, appraisal of damage to the productivity of forest land—have been very fully dealt with in many other publications which are readily available. The space could well have been used to expand other sections of the book.

The remaining chapters, XVI to XX, deal with nursery soils. These accounts are of considerable general interest. Most of the problems discussed, however, pertain to the raising of nursery stock in beds, and in South Africa such problems are, for the most part, avoided by raising nursery stock in trays. This is made possible chiefly because the plants of tree species used here need to remain in the nursery for only about one year. Fresh nursery soil is used every year, and it is returned to the field without much loss because "ball"-planting is almost universal. Under this system the control of watering presents no problem, no fertilizers or manures are needed, soils are readily mixed to the desired sandy-loam consistency, and the development of parasitic organisms in a soil is easily controlled.

The author repeatedly refers to Rubner's "Die Pflanzengeographischen Grundlagen des Waldbaus," 2nd edition, 1925. A revised and enlarged third edition of this valuable reference work was, however, issued in 1934. A fourth, enlarged, edition of Warming's "Lehrbuch der Ökologischen Pflanzen-geographie" issued by Gräbner in 1933, is also not referred to.

In the preface the author states: "The first draft of this book originated from my lectures as prepared for a rather heterogeneous group of students, including graduates and upper-class men in soils, forestry, botany, game management and landscape architecture." The book clearly derives its character from the manner in which it originated, and it is obviously not intended for the specialist, but as a text for students it can be strongly recommended. It will hold the interest of the student because of the lively, easy style in which it is written. For this reason it might also appeal to a wider public and possibly it might also help to stimulate a renewed interest in forest soils with South African forest officers. Few serious soil problems have so far been encountered in the extensive afforestation programme which is being undertaken by the State, but experience in all parts of the world indicates that such problems may be expected. Possibly the time has now come to initiate intensive soil investigations so that trends in soil development under newly-established plantations of exotic trees may be determined and soil problems anticipated by appropriate modifications in silviculture. Professor Wilde's book fills a need by providing a first connected, general account in English of this important subject.

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